REMARKS/ARGUMENTS

Amending all independent claims 1, 8, 83 and 92 to have the following functions, so that the claimed invention can be more patentably distinguished from all cited references.

said JBOD emulation controller is capable of defining at least one logical media unit (LMU) comprising sections of at least one of the physical storage devices and **capable of performing the following two functions: (1) bringing the LMU on line while the JBOD emulation controller is on line and (2) taking the LMU off line while the JBOD emulation controller is on line.**

V. Rejection Based On Prior Art

Claim Rejections under 35 U.S.C. §103

Claims 1-3, 5-9, 11, 13-17, 24-29, 31-35, 38-40, 44, 83, 84, and 86-93 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bicknell et al. (US pub 2003/0193776) in view of Meehan et al.

Point 3 in OA

The amended claim 1 of the claimed invention is directed to a computer system comprising: a host entity for issuing IO requests; an external JBOD emulation controller coupled to the host entity for emulating IO operations in response to the IO requests; and a set of at least one physical storage device coupled to the JBOD emulation controller each through a point-to-point serial-signal interconnect for providing storage to the computer system through the JBOD emulation controller, **wherein said JBOD emulation controller is** capable of defining at least one logical media unit (LMU) comprising sections of at least one of the physical storage devices and **capable of performing the following two functions: (1) bringing the LMU on line while the JBOD emulation controller is on line and (2) taking the LMU off**

line while the JBOD emulation controller is on line.

In contrast, as a matter of fact, no matter what the differences between Meehan and the claimed invention may be, at least Meehan fails to disclose in the claims "a **JBOD emulation**" nor "**said JBOD emulation controller is capable of performing the following two functions: (1) bringing the LMU on line while the JBOD emulation controller is on line and (2) taking the LMU off line while the JBOD emulation controller is on line**"

In addition, no matter what the differences between Bicknell and the claimed invention may be, Bicknell, in paragraph 0019, simply discloses "Disc drive 106 can preferably be removed without disturbing the operation of subsystem 100" and thus does not disclose "**said JBOD emulation controller is capable of performing the function of (1) bringing the LMU on line while the JBOD emulation controller is on line.**" "T**he function that (1) bringing the LMU on line while the JBOD emulation controller is on line" is quite different from the function that "(2) taking the LMU off line while the JBOD emulation controller is on line.**" This will be explained later with reference to the specification of the claimed invention.

Therefore, the amended Claim 1 of the claimed invention no longer violates 35 U.S.C. 103(a), comparing with Bicknell in view of Meehan et al. This will be explained in detail in the following paragraphs.

In addition, applicants respectfully emphasizes that the independent claims of the present invention relates to "bring one of said LMU on line while the JBOD emulation controller is on line and taking one of said LMU off line while the JBOD emulation controller is on line", which are the key functions of the present invention, and thus different from the cited references.

As to "bring one of said LMU on line while the JBOD emulation controller is on line and taking one of said LMU off line while the JBOD emulation controller is on

line", please refer to paragraph [0074] to [0078] of the present invention, in which [0074] The present invention JBOD emulation controller 38, while the system remains on-line, is capable of taking LMUs together with their associated PSDs 36 off line **so that** these PSDs 36 can be physically removed from the subsystem 34, and scanning for and bringing on line LMUs when component PSDs 36 have been physically inserted into the JBOD subsystem 34. **In the simplest case, in which each LMU comprises a single PSD 36, this can be easily done automatically with the help of circuitry and/or device-side IO device interconnect protocol facilities for determining whether a PSD 36 is present and/or connected. [0075] This "plug-and-play" characteristic of the present invention JBOD emulation controller 38 depicted above helps minimize or eliminate the need for manual intervention to bring LMUs on line upon insertion of component PSD(s) 36 and take LMUs off line when PSD(s) 36 are to be removed.** Please refer to FIG. 13 and FIG. 14. FIG. 13 is a sample flow of an automated procedure to monitor for PSDs 36 being inserted and bringing an LMU on line once a quorum of member drives are present. FIG. 14 is a sample flow of an automated procedure to monitor for the removal of PSDs 36 and taking an LMU off line when a quorum of member drives is no longer present. **A quorum herein means a group of one or more member drives of an LMU to which data can be accessed correctly by the subsystem. For example, in RAID 0, a quorum comprises all the member disk drives of an LMU; in RAID 1, a quorum comprises at least one of the mirrored disk drive pair in every mirrored disk drive pair of an LMU; and, in RAID 3 through 5, a quorum comprises at least all but one of the member disk drives of an LMU. [0076]** An important enabling element of the automated on-lining and off-lining of LMUs in response to PSD insertions/removals is a facility for detecting if a PSD 36 is inserted/removed into/from the JBOD enclosure. **FIG. 15 shows an example of such a detection facility. The JBOD emulation controller 38 monitors the state of this detection facility to determine when a PSD 36 is removed or inserted. In the simplest case, in which each logical media unit is composed of a single PSD, removal of the**

PSD will trigger the initiation of the procedure that takes the corresponding logical media unit off line, while insertion will trigger the procedure to scan in and then bring on line the corresponding logical media unit. [0077] In order to support the above-mentioned features of the present invention JBOD subsystem, the JBOD subsystem can further comprises an auto-on-lining mechanism to automatically bring on line a said logical media unit which was previously off-line once a requisite quorum of said PSDs comes on-line, an auto-off-lining mechanism to automatically take off line a said logical media unit which was previously on-line once a requisite quorum of said PSDs becomes off-line, a determining mechanism for automatically determining when a PSD has been removed or when one has been inserted, and a scanning-in mechanism to automatically scan in PSDs on detection of insertion of the PSD. **In short, from the aforesaid descriptions of the present invention, it can be known that the independent claim 1 of the present invention is different from Bicknell and Meehan or their combination.**

Since they are quite different, and the claimed subject matter in the present invention is not fully disclosed in all cited references, the present invention is patentably distinguished from Bicknell and Meehan or their combination.

For aforesaid these reasons, applicant asserts that claim 1 should be found allowable with respect to the teachings of Bicknell et al. and Meehan and/or their combination. Because claims 1, 8, 83 and 92 of the instant application include the same or equivalent features, applicant asserts that they too should be found allowable as well. All claims which are dependent upon base claims 1, 8, 83 and 92 respectively should therefore be allowable with respect to the teachings of Bicknell et al. for at least the same reasons.

Point 6 in the OA

As per dependent claim 5, the instant application claims wherein said LMU are **presented redundantly** to the host entity on more than one host-side IO device interconnect port; on the contrary, paragraph 0019 of Bicknell only discloses a

redundancy system 100, **but fails to disclose that said LMU are presented redundantly to the host entity on more than one host-side IO device interconnect port, and fails to host-side IO device interconnect port.**

Point 9 in the OA

As per claims 13, 86 and 89, the instant application claims comprising auto-on-lining mechanism to automatically bring on line one of said LMU which was previously off-line once a requisite quorum of said PSDs comes on-line, in which the auto-on-lining mechanism is used to make said LMU come on-line once a requisite quorum of said PSDs comes on-line; on the contrary, **paragraph 0030 of Bicknell does not disclose the auto-on-lining mechanism at all, and thus fails to disclose to "make said LMU come on-line once a requisite quorum of said PSDs comes on-line".**

Point 10 in the OA

As per claims 14, 87 and 90, the instant application claims comprising auto-off-lining mechanism to automatically take off line one of said LMU which was previously on-line once a requisite quorum of said PSDs becomes off-line, in which the auto-off-lining mechanism is used to make said LMU come off-line once a requisite quorum of said PSDs comes off-line; on the contrary, **paragraph 0019 of Bicknell only discloses "Disc drive 106 can preferably be removed without disturbing the operation of subsystem 100", but fails to disclose such an auto-off-lining mechanism, and thus fails to disclose to automatically take off line one of said LMU once a requisite quorum of said PSDs becomes off-line.**

Point 11 in the OA

As per claim 15, the instant application claims comprising determining mechanism for automatically determining when a PSD has been removed or when one has been inserted; on the contrary, **paragraph 0019 of Bicknell only disclose "Disc drive 106 can preferably be removed without disturbing the operation of subsystem**

100", but fails to disclose such a determining mechanism for automatically determining when a PSD has been removed or when one has been inserted.

Point 12 in the OA

As per claim 16, the instant application claims comprising scanning-in mechanism to automatically scan in PSDs on detection of insertion of the PSD; on the contrary, **paragraph 0003 of Bicknell only discloses "an electrical connection with the midplane card for data communication with the disc drives", but fails to disclose such a scanning-in mechanism, and thus fails to disclose to automatically scan in PSDs on detection of insertion of the PSD.**

Point 13 in the OA

As per claim 17, the instant application claims comprising information mechanism for informing the host entity when the mapping of said LMUs to host-side interconnect LUNs has changed; on the contrary, **paragraph 0017 of Bicknell only discloses "data stored in the disc drives 106 can still be accessed by the host computer through the remaining active controller 108. In this manner, the reliability of disc storage subsystem 100 is improved.", but fails to disclose such information mechanism for informing the host entity when the mapping of said LMUs to host-side interconnect LUNs has changed.**

Point 20 in the OA

As per claim 31, the instant application claims wherein said LMU are presented redundantly to the host entity on more than one host-side IO device interconnect port; on the contrary, **fig. 6 and paragraph 0037 of Bicknell only disclose the first and second controllers each include a data port(such as 204.11 and 204.12), but fails to disclose wherein said LMU are presented redundantly to the host entity on more than one host-side IO device interconnect port.**

Point 21 in the OA

As per claim 32, the instant application claims comprising **an enclosure management services (EMS) mechanism**, in which the EMS mechanism is an intelligent circuitry that monitors status of various enclosure devices, such as power supplies, fans, temperatures, etc. and can be interrogated by a host for these statuses (please refer to specification of the present invention; on the contrary, **paragraph 0037 of Bicknell only discloses "the multiplexing electronics selectively opens and closes the first and second data communication paths in response to at least one control signal (such as 218 or 220), but fails to disclose, such as power supplies, fans, temperatures, etc.**

In conclusion, multiplexing electronics of Bicknell perform a totally different function from that of the enclosure management services (EMS) mechanism of the claimed invention.

Point 34 in the OA

As per claim 18, the instant application claims comprising unique ID determination mechanism to uniquely identify said PSDs independent of their location in which they are installed in the JBOD subsystem; on the contrary, paragraph [0114] of Watanable and Bicknell only disclose that each volume is also assigned a unique ID 1104a-c, **but fail to disclose or teach such a unique ID determination mechanism for uniquely identifying said PSDs independent of their location in which they are installed in the JBOD subsystem.**

Double patenting

Claims 1-3, 5-11, 13-44 and 83-94 of the instant applicant are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1-53 and 78-95 of co-pending Application 10/707,871

(hereinafter called the reference 871) in view of Bicknell et al. (US pub. 2003/0193776).

As explained and described in point 3 in this paper, since amended claim 1 is amended to have the feature, **wherein said JBOD emulation controller is** capable of defining at least one logical media unit (LMU) comprising sections of at least one of the physical storage devices and **capable of performing the following two functions: (1) bringing the LMU on line while the JBOD emulation controller is on line and (2) taking the LMU off line while the JBOD emulation controller is on line, (a) n**o matter what the differences between the co-pending application 871 and the claimed invention may be, at least the co-pending application '871 neither disclose in the claims "a **JBOD emulation**" nor "**said JBOD emulation controller is capable of performing the following two functions: (1) bringing the LMU on line while the JBOD emulation controller is on line and (2) taking the LMU off line while the JBOD emulation controller is on line**", and (b) no matter what the differences between the co-pending application Bicknell and the claimed invention may be, Bicknell, in paragraph 0019, simply discloses "Disc drive 106 can preferably be removed without disturbing the operation of subsystem 100" and thus does not disclose "**said JBOD emulation controller is capable of performing the function of (1) bringing the LMU on line while the JBOD emulation controller is on line.**" "**The function that (1) bringing the LMU on line while the JBOD emulation controller is on line" is quite different from the function that "(2) taking the LMU off line while the JBOD emulation controller is on line.**", which have been explained and described in aforesaid paragraphs.

Therefore, the amended Claim 1 of the claimed invention no longer violates the judicially created doctrine of obviousness-type double patenting, either comparing with claims 1-53 and 78-95 of the co-pending application '871 alone, or comparing with claims 1-53 and 78-95 of the co-pending application '871 in view of Bicknell et al.

Because the independent claims 8, 83, and 92 of the instant application are also amended in a similar way to that of claim 1 of the instant application to include the two

functions, they do not have double patenting issue in view of reference 871, and thus the dependent claims of the instant application, which depend on the independent claims 1, 8, 83, and 92 are believed not to have double patenting issue as well.

Accordingly, applicants respectfully request that the rejections under the judicially created doctrine of obviousness-type double patenting be withdrawn.

Prior art of Record

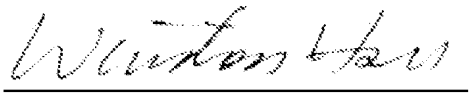
With regard to other prior art made of record in the Office Action, none disclose or teach the claimed invention.

CONCLUSION

In light of the above remarks, all objections and rejections having been addressed, and it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited. If there are any remaining issues to be resolved, the applicant requests that the Examiner contact the undersigned attorney for a telephone interview.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Sincerely yours,



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